Annual Monitoring Report
for Implementing the
Kaibab National Forest Land Management Plan

1997

Forest Supervisor Certification

I certify that the Kaibab National Forest Plan as amended is sufficient to guide management of the Forest over the next year. Needs for change as identified in this document are necessary over time to maintain the viability of the Plan.

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CONNY J. FRISCH Date
Forest Supervisor

Monitoring Activities

The Monitoring Plan for the Kaibab National Forest Plan identifies 58 items to be tracked a measures of the effectiveness of the forest plan. Valuation of various forest resources by society, the Forest Service and other agencies has continued to change since the inception of this Plan in 1988. This has been expressed in public concern and action, as well as governmental action and funding of activities. This, in turn affects what can or should be monitored and how it will be done.

With monitoring, we believe the real question should often be, "Is the Forest better today than five years ago" for particular conditions or habitats. The current monitoring criteria often do not address this issue in any meaningful way.

Riparian Areas

A complete riparian/wetland survey was finished in 1990 for the Kaibab NF. This survey includes information about condition, seral stage, TES, and photos along with a brief narrative. This information will serve as a baseline for future condition inventories. At this time, no other comparable inventories and analysis have been carried out.

In 1986, the Chalender RD completed a photo inventory of several riparian areas on the District where about half of the water perimeter was fenced to exclude livestock. In most cases, the difference between the fenced and unfenced areas is dramatic, with much more emergent plant coverage present in the fenced portions. Because nearly all of the waters on the Kaibab are artificial, what riparian areas do exist provide locally unusual conditions which are important to a number of wildlife species. There is the potential to increase the presence of emergent vegetation while still providing livestock water in these same areas by excluding more of the watered area, but funding is very limited for this activity.

Partnerships, including some with the Arizona Game and Fish Department are possibilities, but have not been proposed at this time. Work along these lines is being accomplished for key riparian areas on a project-by-project basis. A 1997 example is the Elk Springs/Dog Knobs AMP revision, which includes protection for three wet areas.

Bridger Salvage Sales

The Bridger Complex burned about 54,000 acres of the North Kaibab Ranger District in the summer of 1996. As a result of the effects of the fire, two major projects have begun: the Bridger Salvage Sales and the Central Winter Ecosystem Management Area analysis. Based upon identified knowledge gaps and/or public issues, monitoring plans have been designed to track particular resource changes or effects.

The baseline data collection for Bridger Salvage Sales and two subsequent remeasurements have been completed for several items. Much of the information being collected and subsequent analysis may provide significant guidance on how the Forest responds to future catastrophic fires. Opportunities to gain more information about snag longevity and bark beetle activity following a large fire are being taken as well.

The data collection and analysis are being done informally in concert with the Coconino NF, which also experienced two large fires in 1986. We are collecting the data in a similar manner, so some landscape-level comparisons about fire-induced mortality can be made. A Coconino NF employee is taking part of the data gathering and analysis task for his masters thesis at Northern Arizona

University. Several NAU professors have also been involved both formally and informally in the design of the project monitoring plan, data collection and analysis. Personnel from the Arizona Zone of the Regional Forest Health group also helped with design and data collection, including aerial pest detection surveys.

Contacts with Rocky Mountain Station to gain their involvement proved unsuccessful. We are in receipt of FS-608, "Integrating Science and Decisionmaking" and intend to apply the principles therein to future efforts with the Station.

Wildlife

One current and extremely important example, is the on-going goshawk demography study by Rocky Mountain Station. Dr. Richard Reynold's study began on the Kaibab Plateau in 1991. Funding for this project is diminishing even though it is probably the most important work-enabling study and monitoring effort in the Region, and possibly in the Service. **The results, if completed and published, may well provide significant evidence about the continuing viability of the northern goshawk in an area which has received substantial logging activity. This sort of information may be just what is needed to prevent listing of the northern goshawk. In any case, it would provide substantial information about the long-term population dynamics of this wide-ranging and widely distributed species where various management activities are present.**

Greater than 95% of the existing territories have been located on the Kaibab Plateau and it is just in the last two years that enough information has been accumulated, where the researchers can begin to determine how and if management activities truly are impacting the goshawk population on the Plateau. In addition, during this time, the researchers have observed the small mammal population (goshawk prey base) decline in numbers (begin to cycle). As a result, annual monitoring of the goshawks territories show poor reproduction. It is important to complete the cycle of small mammal population recovery and then document effects on the goshawk population. The researchers hypothesize that the goshawks will respond to the increase in prey base, with an increase in reproduction, thus showing that mostly factors other than current management practices are responsible for fluctuations in the goshawk population. But in order to show this, th project must continue until the small mammal cycle is completed. We strongly suggest that the Region consider supporting this project.

Interpretation

Monitoring of interpretive programs on the Kaibab proceeds on two levels.

Internally, we have monitoring forms which the Forest Interpretive Specialist and District Interpretive Supervisors use as they attend and audit programs. These are given to the employee (and discussed) for their input as well and filed. The purpose is for individual improvement toward excellence as well as to make sure the message and quality of interpretation is as planned.

Externally, we use a Voluntary Response Form for feedback from the audience/public. The purpose of this is to give them a chance for input as to their view of the quality of the programs and how we can meet their needs through interpretation. We also get an idea of demographics. The District Interpretive Supervisors then use the information in planning next year's schedule of programs and training.

A specific opportunity to interpret both a natural event and our management response while also soliciting public feedback is being planned with the Bridger Complex and associated salvage sales. Information from the feedback - mostly expected to come from users of a popular trailhead near the

salvaged area - is likely to be constructive in deciding how to respond to future catastrophic natural events.

Appeals/Litigation

Perhaps the largest - albeit ad hoc - program for monitoring the implementation of the Forest Plan is a series of appeals by an environmental group and our subsequent (successful) defense of our proposals before the Appeal Resolution Officer. This program tends to be limited in context, because it only focuses on issues popular with the appelant (old growth/large trees, TE&S species, snags and dwarf-mistletoe in the context of NEPA, NFMA and APA) and it only addresses project planning and implementation. Never-the-less, some of this activity has lead to changes in project design or analysis and in one case modification of a project underway.

At the Regional scale, the litigation activity has probably lead to a reduction of funds available for important on-the-ground monitoring, such as Reynolds study of northern goshawks, as time and money are diverted into micro-habitat monitoring of the Mexican spotted owl, preparation/publication of bibliographies, and local costs of responding to numerous lawsuits.

Monitoring Plan

Details of the Forest Plan Monitoring Items are listed at the end of this report. Complete information for 1997 is not yet available as the deadline for reporting these figures in other reports has not yet been reached in most cases. A summary of Monitoring Plan accomplishment for 1997 follows.

Resource Addressed	Number of Items	Number Monitored
Timber	10	10
Protection	1	1
Range	4	4
Recreation	6	5
Heritage	3	3
Wilderness	1	1
Visual	1	1
Soil	1	1
Land Management	1	1
Wildlife	29	12
Facilities	1	1
TOTAL	57	40

Many of the items for wildlife are monitored by the Arizona Game and Fish Department (population numbers). Others are probably no longer appropriate with the change in timber harvest practices on this Forest. These will be addressed in a future Plan amendment. For all monitoring, budget reductions have been a major impediment to effective monitoring, along with a lack of emphasis on it.

Social, Economic and Ecological Forest Plan Objectives

The objectives in the Kaibab Forest Plan are expressed in terms of timber sale outputs, types and amount of vegetative treatment, rights-of-way acquired, recreation investments, ORV closures,

visual quality objectives and old growth allocated. Social objectives are not directly addressed in this Plan. Consideration to this will be made in a future amendment.

The latter four of the listed objective sets have been largely attained. The 6/96 amendment essentially recognized a shift which had already taken place on the Kaibab NF with respect to the first two objectives. Timber production is less than 1/3 of ASQ and is expected to remain in that range or less. Uneven-aged management, hardly even mentioned in the 1988 Plan, is now the norm on this Forest, along with substantially more thinning of small-diameter trees.

Economically, these changes contributed to the closure of several sawmills, most notably, Kaibab Industries in Fredonia. Review of 1990 Census data and subsequent Utah Job Service and local crime information indicates both the social and economic effects were profound. A follow-up has not recently been done to identify attenuation of effects, but it seems quite likely they have diminished over time.

Changes in public expectations about how the Forest is managed are generally being accomodated. The Forest has been able to keep up with increased recreational demand to this point, although a number of problems are looming, especially with respect to deteriorating infrastructure.

There is in increase in polarization of the public involved in forest management issues. The Forest is responding to this with collaborative efforts, public involvement plans and other communication, including establishment of a home page. In the past two years, the Forest has also sponsored workshops on the status of aspen and oak on the Forest. Some number of people representing various interests, from academia to industry and environmental groups have participated in these efforts and have reported favorably on them. In 1997, two major projects have proceeded more smoothly than initially expected: the Bridger Salvage Sales and the Tusayan Growth EIS. In both cases, how and when the public was involved made the difference.

Monitoring Requirements of other Laws

Clean Water Act, Clean Air Act, Endangered Species Act

We comply with the Clean Water Act through the implementation of Best Management Practices (BMPs) on our projects. We include these in design of allotment management plans, timber sales and road work. We also maintain contacts with the Arizona Department of Environmental Quality on large project proposals.

The National Forests in Arizona fund a position with ADEQ to coordinate our prescribed burning programs and ensure compliance with the Clean Air Act. This position and the relationships built between agencies has been quite successful in maintaining good will while accomplishing needed work.

The Endangered Species Act is complied with through project designs which meet recovery plan requirements and maintain the viability of all TE&S species. We also consult with the USF&WS on all projects where this is required. Biological Assessment and Evaluations must be completed prior to approval of NEPA decision documents and are now maintained in the Supervisor's Office. The Forest is also pursuing Conservation Agreements on two plant species to expedite recovery and thus obviate listing - Arizona bugbane and the Paradine plains pediocactus.

Research Needs Update

Northern goshawk - It is essential to complete the demographics study underway by Dr. Reynolds. This issue is discussed under "Wildlife", above.

Forest restoration - This field is being actively pursued by Drs. Covington and Moore at NAU and the Southwest Center for Biological Diversity, regionally. It includes at least one proposal on this Forest. While we have heard lots of debate by various RMS scientists about the value of this work, there have been no proposals we are aware of to put the value of "restored" forests in perspective with other scenarios.

Pine-oak - We seem to have lost a large number of our larger oak stems, mostly due to fuelwood cutting, especially by theft. These large oak appear to be quite important to forest structure and function in much of our forest. We have very little information to apply in replacing these. We think thinning and some burning will help but don't really know. Research into methods and time factors involved would be helpful.

Pinyon-juniper/grassland pre-European settlement conditions - We are beginning to get a fair amount of information on conditions in ponderosa pine. This information is quite helpful in getting some idea of the relative effects of changes proposed by management and what the costs and benefits might be to an ecosystem where life has co-evolved under relatively stable conditions for the past few thousand years. Pinyon-juniper is a very common cover type on the Kaibab and in the Southwest. It would be helpful to have similar information for these ecosystems, as well.

Smoke management near populated areas - As we move into prescribed burning in the urban interface, the issue of smoke in populated areas is likely to grow. It would be important to get good distribution of existing research, and possibly new research started.

Emerging Issues and Trends

On this Forest, emerging issues are fairly typical of all Southwestern Forests with some exceptions. Budgets are declining faster on this Forest than most. Collaboration and partnering is increasing. Riparian issues, including T&E species associated with them are not becoming as critical as elsewhere.

We are experiencing changes in who uses the Forest and how they (and we) view it. Up until now, increases in recreational use have been within the bounds forecast in the 1988 Plan but the type of use is changing. Mountain bikes are growing popularity. We expect increased fees and increasing limitations on visitation to Grand canyon National Park to increase use of the Forest, including wilderness areas. The North Kaibab RD is partnering with NAU to implement a campsite monitoring and inventory sample in the Kanab Creek Wilderness this year. Over time, other wilderness areas will be added to the sampling. Our tracking of visitors to developed sites is partly through the interpretative program and is discussed above.

The risk and fact of catastrophic fires are being realized now, especially in the urban interface. People are increasingly supportive of action, although there are also those adamantly opposed to management to either mitigate risk or (especially) to salvage timber after large fires. A monitoring plan for the Bridger Salvage Sales has been established and is described above.

The Forest is shifting much of its work emphasis to the range program due to several factors including compliance with the Burns Amendment schedule, the number of permits expiring soon and public interest in grazing effects. A monitoring plan is being designed collaboratively for the Central Winter Allotment to address issues raised from a variety of interested people.

Current and Potential Monitoring Partnerships

Most of our current monitoring partnerships are with NAU (Bridger Salvage Sales, Central Winter, Kanab Creek Wilderness and Frenchy EMU), Arizona Game and Fish Department (Bridger

Salvage Sales, bats and other wildlife populations, maintaining the Heritage database and water development maintenance) and Rocky Mountain Station (uneven-aged growth plots, goshawk demography).

Opportunities for partnerships probably exist for monitoring populations of rare or endangered species, including the Paradine plains cactus and noxious weeds through groups such as the Arboretum at Flagstaff and even ADOT. Others who might be interested in helping monitor economic, social and biological conditions include, Grand Canyon Trust, the Southwest Center for Biological Diversity, permit holders and local residents. These opportunities have not yet been seriously pursued.

Barriers to Effective Monitoring and Evaluation

The biggest barrier to effective monitoring and evaluation appears to be a lack of emphasis, both internally and externally; which other mandated or important activities will the Forest and/or others drop to do this work?

In the case of Bridger Salvage Sales, an effort was made to bring RMS into the work but both funding and timing proved insurmountable. We have also found competition between NAU and RMS to be a barrier. In this case, we simply continue to talk to people, in line with the guidelines in FS-608.

The Forest's vision emphasizes a Learning Organization. As we begin new projects with this in mind, opportunities have begun to emerge that are likely to lead to more monitoring and evaluation. The Natural Resources Group is drafting a plan to evaluate the status of project monitoring plans documented in EAs over the past several years. Besides verifying the level of implementation, effectiveness monitoring will also be carried out and evaluated for some items.

Combining the Learning Organization with a second branch in the vision - Relationships - other opportunities are beginning to emerge. In FY 1998, two demonstration projects involving other partners, monitoring and evaluation are planned. Both involve NAU researchers in restoration efforts. The Grand Canyon National Park is involved in one of these and the Southwest Center for Biological Diversity in the other.

Detailed Forest Plan Monitoring Information

All ten Timber items have been monitored. Items 1-5, 8 and 9 all deal with outputs of a particular type, either implementation of particular prescriptions or volume produced. Case law since the Plan's inception has shown that this sort of information is not part of a Plan decision and does not require evaluation on that basis. Some of the measures are useful for tracking the rate at which the Forest is dealing with currently perceived issues of forest health (especially thinning items) or contributions to local community economic health (volume produced items).

Timber 1	Pre-commercial Thinning	847 acres
Timber 2	Commercial Thinning	38 acres

Neither of the two thinning items are being accomplished at a rate which will keep up with growth. The reasons for this are complex and involve conflict with some Standards and Guidelines (including those for wildlife cover, goshawk and Mexican spotted owl management), economics (especially in the case of pre-commercial and pulpwood product thinning), and litigation (which has the effect of creating cascading delays in project implementation while running up costs).

Timber 3	Shelterwood Seed Cutting	3 acres
Timber 4	Shelterwood Removal Cutting	0 acres

These two items are well below the expected amounts this far into the Plan. As the Plan has been amended to emphasize old trees and uneven-aged management, these are unlikely to rise during the life of this Plan. The effects of the changes are evaluated in the Regional EIS which amended the Plan. Tracking acres of even-aged and uneven-aged regeneration generically would probably be more responsive to current issues. This will be considered for a future amendment.

Timber 5	Restock. of Regen. Cut	YYY acres
Timber 6	Restock. of Planted Areas	ZZZ acres
Timber 7	Review of max size limits	N/A acres

Only one opening (R3 Guide definition) was created in 1997 through timber harvest and it was only 3 acres, far below the 40 acre limit currently set. The opportunity to evaluate this measure does not exist for harvest openings created in 1997. The Forest has been largely successful in regenerating harvest openings in a timely manner in the past. Opening size seems to bear little relation to success. A better predictor of regeneration success in harvest (or any other type of) opening would be the density of ungulates, especially elk during the first several years following regeneration. With the major shift in regeneration methods incorporated in the June, 1996 amendment to the Plan, this monitoring item has little further utility in any case. The Forest will consider dropping it in a future amendment.

Timber 8	Net Sawtimber Sold	23,731 MBF
	" " Harvested	14,900 MBF
Timber 9	Net P-J Fuelwood Sold	3,256 MBF
	" " " Harvested	3,074 MBF

The vast majority of the wood sold and harvested in 1997 came from the Bridger Salvage Sales (18,771 MBF sold, mostly harvested). Additionally, 3,825 MBF of pulpwood was sold.

Weak pulp markets have resulted in only 42 MBF being harvested and three other sales totalling 14,088 MBF receiving no bids. These sales are being reappraised and will be reoffered. The combination of high appraisal prices in weak pulp markets, along with lawsuits tying up the more profitable sawtimber may be leaving many mills in a no-win situation: they have wood under contract (and money tied up in deposits and guarantees) but will only loose money if they harvest and haul what they can legally take at this time.

This situation leaves the Forest in an uncertain position as well. Tree cutting is used as an important tool to improve wildlife habitat, reduce forest health risks and meet other Plan objectives. If we change the mix in sales to increase the sawtimber component, we then leave more of the smaller tree cutting to non-commercial methods. The outcome of this will either be higher costs or less work done or both. On a case-by-case basis, we will choose either not to offer the sales at all or meet fewer of the wildlife and health objectives than we would if lawsuits were not constraining our management choices.

The Forest has not come anywhere near meeting 75% or more of the ASQ (77 MMBF/Yr) in several years. It is not expected that this will occur in the foreseeable future for reasons discussed in the 1993 Five-Year Monitoring Report. The objectives of projects within the amended Plan are fundamentally different than they were when the original Plan was crafted. Now, many trees are generally intended to be carried on uneven-aged sites for a minimum of 200 years. Additionally, more of the biomass produced is intended to provide structure (snags, down logs) and function (nutrient cycling with fire, old growth and very large trees). If a new ASQ were calculated today, it would be much lower than 77 million board feet per year.

Timber 10 Evaluate Unsuitable Timberland ~45,000 acres

The trends for this item have generally resulted in fewer acres in the suitable timber base as project-level evaluations continue. The primary reason for this is because there are more lands in the suitable timber base that turn out not to be suitable than conversely. Since the inception of the Plan in May, 1988, the net effect of site-specific evaluations has been a reduction of suitable acres from 479,132 to 404,810 currently - a decrease of 15.5%. It may be appropriate to continue monitoring this item for the time being but its utility appears to be declining. Most timber harvest planned and carried out on the Forest is primarily for purposes other than timber production. Monitoring Items Timber 5 and Timber 6 adequately address the germane issue in the amended Plan.

Protection 1 Destructive I&D increases after tree-cutting 4437 acres

The 1997 aerial destructive insect and disease (I&D) detection survey has not yet been received by the Forest. Past surveys, completed annually for the life of the Plan have documented no unacceptable increases in tree mortality resulting from silvicultural activities. To the contrary, much of the mortality reported for the entire period appears to be associated with densely-stocked tree conditions combined with drought and/or fire.

There is some site-specific evidence that dwarf-mistletoe (DM) levels have increased following thinnings and other treatments apparently intended to reduce DM. These treatments appear to have been unsuccessful because too many trees either with some DM evident, with latent infections, or too close to infected trees were left. The treatments didn't go far enough. It appears that other strategies should be considered where DM is prevalent. The continued involvement of forest pathologists and entomologists in project design where I&D levels are of concern is warranted.

The Bridger Complex is being closely monitored this year for possible build-up of bark beetles due to the presence of large numbers of recently killed or dying trees.

Range 1	Wild Burro Populations	N/A animals

One survey was made this year for wild burros. No burros or tracks were found on-Forest. Since it had recently rained and the burros range well off-Forest, this is probably insignificant. The task of monitoring the burros is larger than the Kaibab NF. An opportunity to work with the Game and Fish Department might be appropriate as they carry out aerial surveys for other large animals now.

Range 2	Permitted Grazing Use and Grazing Capacity	75,121 AUM

Grazing Capacity is very roughly estimated at 71,000 AUMs. Actual use in 1997 was 55,100 AUMs. Allotments have been prioritized per the Burns Amendment and analysis is proceeding on schedule. With most allotment analyses, permitted numbers are being reduced or remaining constant. The Forest is likely to have permitted use fully balanced with capacity by 2003.

One large allotment on the North Kaibab RD (Central Winter) currently has grazing deferred while the analysis takes place. This allotment was moved up in the schedule after the Bridger Complex affected over 50,000 acres of the allotment.

Range 3	Range Structural Improvements	22 structures
Range 4	Range Non-structural Improvements	400 acres

Planned improvements were accomplished.

Recreation 1	Public Sector Developed Recreation Use	N/A RVD
Recreation 2	Private Sector Developed Recreation Use	N/A RVD

Total public sector recreation use is estimated at 347 MRVDs for 1997. (The final figure is not yet available, nor is any estimate for private sector use.) The projected amount in the Plan is 314 MRVDs/yr for public and 276 MRVDs/yr for private sector. Public sector use is 11% over Plan estimates. Private sector is likely to be close to 75% of the Plan estimate.

Recreation 3	O&M of Public Sector Developed Rec. Sites	583 MPAOT-Day
Recreation 4	Private Sector Developed Recreation Site Const.	0 PAOT

This is over 125% of the Plan projection of 429 MPAOT-Days. Operating the campgrounds under concession special use permits has expanded the managed season of use. In the short term, this is not cause for concern.

No significant expansion of private sector developed recreation sites has occurred recently. Plans are in existence for expansion in several locations on or near the Forest.

Recreation 5	Dispersed Recreation Site Investments	N/A PAOT

The Forest has essentially completed the work originally identified in the Forest Plan (Table 15). We are now taking ecosystem-wide looks at the recreation program to determine where, what and how much recreation use should be accommodated. The analysis has been completed for the Kaibab Plateau (north of Grand Canyon). The two southern ecosystems should be completed in 1998.

Recreation 6 Wildlife and Fish Recreation Use N/A WFUD

This item has not been monitored on this Forest. The opportunity the secure appropriate information from the Arizona Game and Fish Department exists, but has not been pursued.

Generally, the goals for recreation are being met on this Forest. However, deteriorating infrastructure, especially campgrounds is taking a cumulative toll on the Forest's ability to respond to increases, or even maintain current use levels. White Horse Lake Campground was renovated this summer. The Forest has two visitor centers which are run in partnership or cooperation with others, including the City of Williams, the Williams Chamber of Commerce and the Grand Canyon National Park.

Cult.Resrce 1 Protection of Cultural Resource Properties 193 Properties
Cult.Resrce 2 Evaluation of Cultural Resource Properties 24 Properties
Cult.Resrce 3 Cultural Resource Inventory Non-Project Areas 1172 Acres

Cultural resource surveys continue to be completed and SHPO concurrence sought where necessary for all ground-disturbing projects.

Wilderness 1 Wilderness Use 6 MRVD

1996 figure reported. Information for 1997 for the four wilderness areas on the Kaibab NF is not yet available. The Kaibab NF portion of the Sycamore Canyon Wilderness is managed under the Coconino NF Plan; the entire Kendrick Mountain Wilderness is managed under the Kaibab NF Plan. The Forest generally has much less wilderness use than was projected in the Plan. The Forest continues to implement the schedules as opportunity and limited funding permit. Use of the Kanab Creek and Saddle Mountain Wildernesses is expected to jump due to price increases by Grand canyon National Park for backcountry use there.

The need for monitoring visitor impacts will likely increase as use increases. One district is partnering with NAU to design and implement campsite monitoring plots in the Kanab Creek Wilderness area. Other wildernesses may be added to monitoring later.

Vis. Resrce 1 Effects of Management Practices on Visual Qual. N/A Acres

Visual Quality Objectives are in place and have been met for all projects for the past several years. Visual enhancement has been an identified goal of only a few projects including one recently completed in the Kaibab Plateau - North Rim Parkway, as well as along FR 422 (as part of a timber sale). Modifications to highway department clearing proposals along Interstate 40 were also implemented to reduce visual impacts of safety mitigation measures. Since the Forest switched to uneven-aged management with abundant, large, old trees in the desired condition, many of the potential problems with meeting visual quality objectives have been fully addressed.

The Forest is beginning the analysis necessary to implement the Scenery Management System (SMS) at the project/landscape level. An amendment would be needed to fully implement SMS and will be considered prior to a revision scheduled for 2003. Monitoring of SMS implementation would likely focus on Landscape Character and Scenic Integrity.

Soil 1 Unsastifactory Watershed Condition 2545 Acres

With almost 140,000 acres of unsatisfactory watershed condition planned for treatment in the first decade of the Plan, and only about 12,000 acres (less than ten percent) completed, it is very unlikely as much of this will be directly addressed as planned. Money for this activity has been very limited. However, indirect methods of addressing the problem have beenpursued. Examples include: Addressing over-stocked allotments totalling 209,000 acres and reducing use by 9725 AUMs; changes in grazing season which have effected improvement on 20,000 acres; and, fuelwood harvest in invaded grasslands and PJ designed to improve watershed condition on 6,000 acres.

The 349,000 acres of unsatisfactory watershed condition identified in the Plan are in PJ on slopes less than 40% slope. They are probably best treated with a combination of removal of invaded or overstocked PJ, grazing reductions (possibly including wild ungulates) and re-introduction of fire. Attempts to begin with fire on the Williams/Chalender Districts proved unsuccessful; even on warm, windy, dry days, the fuel (PJ with no understory) is just too discontinuous to carry fire.

LMP 1: Resource Information Management Systems, Inventory and Data Collection Systems for various resources

The Forest has used a GRASS GIS for several years and continues to use it everywhere except the North Kaibab RD, where ARC-Info is in use with implementation of the IBM contract. The Supervisors Office and the Tusayan RD were scheduled to be fully implemented earlier this year. Repeated delays due to both governmental action and contractor supply shortage have put off full implementation for several months, at least. The Forest has received complete Cartographic Feature File (CFF) coverage this year. It is available in GIS at all RDs and the SO.

Forest Vegetative Conditions (RMRIS and GIS for Timber, Range, Wildlife and Fish Habitat and Forest Protection)

The Forest conducts two basic types of inventories of vegetative condition: Stage II stand exams, with additional information collected for snags and fuels; and, grass-forb-shrub information from range transects and permanent clusters. All inventories are added to the RMRIS database, whether they originate from post-project implementation inventories or inventories in anticipation of a future project.

At present, it is quite difficult to make detailed comparisons of forest conditions over time with Stage II data because new exams over-write the old exams, rather than supplementing them in some way. For the range transects, this is not a problem because there is room in the database to track the information with each new survey.

Recently, funding for these surveys has declined substantially at the same time their complexity has increased. The result is greatly reduced acerage inventoried quantitatively each year. Table I summarizes inventories by the indicated time period and type.

Table I
Vegetative Inventories by Time Period and Type

Year	Quantitative Stand Exam	Range Forage Exam
1989	82,534	0
1990	100,941	3,296
1991	77,908	1,731
1992	42,803	2,638
1993	34,187	10,259

1994	26,829	5,539
1995	18,155	12,846
1996	6,245	13,818
1997 (min)	4,712	13,950

Reductions in inventories, both post-project implementation and pre-project, impact our ability to monitor conditions for a variety of resources and concerns over time. These include habitat for TE&S species, insect, disease and fire risk, old growth conditions, timber resources and, in general, the difference between desired and existing conditions. The problem is not judged to be serious at this time, however, it is cumulative.

Transportation Facilities Inventories

The transportation system (Forest roads and trails) is maintained in TontoCAD at this time, where attributing of roads is occurring at a slow pace, due to funding and priority limitations. This information is being moved into the GIS as time permits, matching the much less complete CFF layer in GIS with the TontoCAD data. At this time, the system seems adequate for project planning and scheduling maintenance.

The INFRA database has been implemented on the Kaibab NF. At this time, all the buildings on the Forest are in the system. The next few steps include adding in recreation facilities, range improvements, permit information and building appropriate links to the GIS.

Cultural Resources

All heritage sites have now been digitized and attributed in the GIS for the entire Forest. The sites are linked to the CRAIS database. The Heritage resources Section is also tying digital photos to sites in ARC-Info, so a visual representation of many sites are now quickly available electronically.

Wildlife 1	Wildlife and Fish Non-structural Improvements	24,801	Acres
Wildlife 2	Wildlife & Fish Structural Habitat Improvements	76 Structures	

This is the first year we are able to report the amount of wildlife habitat improvement we have actually carried out. In the past, we have been constrained to reporting only what was specifically funded by "wildlife" dollars. The old approach does not reflect what is actually occurring with the resources; it instead seems to be aimed at sustaining functional organizational structures. The new approach could be even better if it were focused on attainment or progress toward certain conditions, rather than just "improvements". This will be considered in future amendments.

Wildlife 3	Goshawk and Spotted Owl: Old Growth Habitat	71,870+ acres

The entire Forest was inventoried to determine the "best" areas with suitable old growth or with the "best" potential old growth in 1989-1991. The "best" 15 percent of the "suitable timber base" was allocated and is recorded in RMRIS. Each Ecosystem Management Area has the prescribed 15%. Because the allocation was made based on the best within a EMA and not on each landscape block, some blocks exceed the 15% and some are less.

An additional allocation - by various means - is being made to equal at least 20 percent of the forested landscape to comply with the June, 1996 amendment. The next reporting year is 1998. The best tool for measuring old growth is the stand data base. A flaw currently found in RMRIS is that any new data replaces the old data and the old data is lost as a reference.

There continues to be much controversy concerning the definition of "old growth". Old growth is not some structure but more of a value. Science is continuing to update our knowledge on the pre-settlement forest structure. The emerging picture of "natural" forests as old growth conflicts with some public values about what old growth should be. It is impossible to agree upon measures of old growth when there is no commonly shared definition. The thinking within the original Plan called for "blocks" of land allocated totally to large old trees. Science is now revealing that most large old trees in the Southwest occurred in small groups of less than an acre in association with younger trees.

In 1998, we are planning a collaborative effort to articulate the questions associated with the structure and management of old growth with an emphasis on sustainability. While we have identified catastrophic fires, insects and high site densities as major risks to large old trees, some members of the public are more concerned about the threats management brings. There currently is no monitoring prescribed in the Plan for these types of risks. We will need to answer the questions of how many acres we have in large old trees, how these are arranged across the landscape, and how many acres are we moving into the large old tree structure.

Wildlife 4	Goshawk and Spotted Owl - nest location, occupancy, and productivity.	northern goshawks 133(nk)+47(sk) territories 30/108(nk)+11/25(sk) occupied 25/30(nk)+2/2(sk) fledged Mexican spotted owls 6 territories 3/5 occupied 0/0 fledged

The intent is to maintain population and habitat effectiveness. The habitat has been defined in the "Management Recommendations for the Northern Goshawk in the Southwestern United States" and in the "Recovery Plan for the Mexican Spotted Owl". Habitat monitoring is being done today with pre and post-stand exams. Realistic evaluations can be made to determine if treatments are valid in moving existing conditions to desired conditions.

Population monitoring is very difficult and cannot be done by only revisiting old nest sites. Population monitoring is defined for the Mexican spotted owl through the recovery plan. It would have to be done on a Region wide basis and will be very expensive. This type of intensive monitoring has never been done in the Region and it is not known if the Region will receive adequate funding. Research is doing population monitoring on the Kaibab Plateau, however, it is not being done anywhere else in the Region. Therefore, it does not provide information on the southwest population. Like the spotted owl, any population monitoring needs to be on a Region wide basis and will be very expensive. This is true for any wide ranging species. An exception to this would be the game species currently monitored by the Arizona Game and Fish Department.

The Forest will be most effective in evaluating habitat and that populations be monitored through inferences made by changes in habitat.

Wildlife 5	Pygmy Nuthatch - amount old growth habitat	71,870+ acres

For further detail see discussion under No. 3, above.

Wildlife 6	Pygmy Nuthatch - snag densities and sizes (existing and future).	lg. snag/ac sm. snag/ac

	Cover Type	Large Snags (>=18")		Small Snags (12-17.9")		# Sites w/ Exams
Southern RDs	aspen	.44		.82		11
	Douglas-fir	.76	.93	4		
	juniper	.14	.09	113		
	oak	.12	.10	391		
	pinyon-juniper	.50	1.24	194		
	ponderosa pine	.28	.31	1713		
	trees - untyped	3.73		.00		3
	white fir	1.27	1.35	9		
No. Kaibab RD	aspen					
	Douglas-fir					
	juniper					
	oak					
	pinyon-juniper					
	ponderosa pine					
	trees - untyped					
	white fir					

This monitoring effort should be for the special component, snags. Snags (as well as green trees with cavities) are essential for a number of species and should be the monitoring element, not pygmy nuthatch. An inventory that includes snags is included in stand exams. For a large area the stand exam data (as stored in RMRIS) is adequate for determining adequacy of snags. A larger sample size is necessary for sampling on smaller scales. Current direction describes the desired condition of snags and reserve trees. The Forest will consider a minor Plan amendment to clarify this situation.

Wildlife 7 Turkey - roost density N/A roosts/ac

Turkey roosts are critical only where there is a shortage of large old trees and they may be removed. Finding roosts on the North Kaibab is not critical with the current management direction of maintaining the mature forest over the landscape and the existence of abundant large old trees. On the southern Districts it is not critical under the current management where most large old trees are maintained with the exception of disease. The largest threat to this special component on the southern three Districts is fire and insects due to overstocking . There currently is no monitoring prescribed in the Plan for this risk (also see No. 3, old growth). The Forest will consider a Plan amendment to include monitoring for this risk instead, along with tree density by size class.

Wildlife 8 Turkey - population trend N/A birds

Arizona Game and Fish Department monitors turkey numbers through modeling and through hunter success rates. These numbers are available from the Department. On the southern Districts, brood counts are done. This past winter, as a result of the Bridger fire, the Arizona Game and Fish Department, North Kaibab and the Arizona Chapter of the National Turkey Federation made a coordinated effort to monitor winter survival (49 turkeys with transmitters) on the west side winter range.

We have not met the Comprehensive Plan goal for turkey numbers, however, there has not been a 25% decrease in numbers.

Wildlife 9 Red Squirrel N/A Acres

This was an issue with short rotation, even-aged management. Under the current direction, this should no longer be an issue, and is being provided for on all vegetation-modifying projects in red squirrel habitat.

Wildlife 10 Elk and Mule Deer - amount of hiding and thermal cover Acres

This was an issue with short rotation, even-aged, evenly spaced management. It is an issue when current conditions are still even-aged and there is little or no regeneration. Through a collaborative and adaptive management process current S&G's need to be reviewed.

Wildlife 11 Elk and deer - reproductive and key area parameters N/A acres

No post-treatment monitoring has been done by the FS. Numbers of deer and elk remain either steady or on the increase. Again this was an issue with short rotation, even-aged, evenly spaced management. For some areas this may still be an issue with the current conditions.

Wildlife 12 Elk and deer - browse and forage use and age class structure of browse. N/A acres

Browse/forage monitoring is conducted in association with allotment analysis and includes all grazing animals. No break-out of use by elk and deer has been made. Another question that is not asked is, "are areas that were historically or currently in browse being maintained or are they being lost or suppressed due to invasion of trees.?". Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 13 Elk and Mule Deer - population trends and distribution. head

Both elk and mule deer numbers are within the Comprehensive Plan goals. We presently have the risk of elk numbers exceeding these goals. These are available from Arizona Game and Fish Department.

Wildlife 14 Tassel-eared Squirrel - amount of suitable habitat acres

The S&Gs were written to be used with the R03WILD habitat model. This is a very crude model based on even-aged, even-spaced, and short-rotation management. R03WILD is not able to take into account either landscape patterns or inter-stand variation. Current direction is for uneven-aged, mature forest, with irregularly spaced trees which should benefit the tassel-eared squirrel. However, there is not agreement with landscape patterns and further work needs to be done collaboratively to seek consensus.

Wildlife 15 Tassel-eared Squirrel - population trend numbers

According to the Plan, Arizona Game and Fish Department surveys are to be used. However, the Arizona Game and Fish has not developed a reliable technique for surveys. The research branch of the Department is currently doing a multi-year study with this objective. As of now

there is no data. Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 16 Hairy Woodpecker and Yellow-Bellied sapsucker - snag densities, sizes, and species (existing and future).

See No. 6. There need be only one monitoring item for snags. Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 17 Plain Titmouse - amount of old growth habitat.

See No. 3. There should be only one monitoring item for old growth. Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 18 - Plain Titmouse - snag densities and sizes.

See number 6. There should be only one monitoring item for snags. Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 19 Antelope - forage use N/A acres

Browse/forage monitoring is conducted in association with allotment analysis and includes all grazing animals. No break-out of use by antelope has been made. Another question that is not asked is, "are areas that were historically or currently in browse being maintained or are they being lost or suppressed due to invasion of trees.?". Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 20 Antelope - population trends N/A head

Data is available from Arizona Game and Fish Department.

Wildlife 21 Cinnamon Teal - amount of suitable nesting habitat N/A acres

The cinnamon teal was selected as an indicator because of the importance (rarity) of wetlands. A more appropriate measure may be the health of the existing wetlands not nesting habitat and nesting success. Therefore, monitoring should deal with the wetlands and not one species. If the wetlands are in good condition, then, one can infer that cinnamon teal, and other wetland dependant species, are in as good a condition as one could expect. Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 22 Cinnamon Teal - nesting success N/A numbers

Same as No. 21.

Wildlife 23 Riparian Areas - habitat condition N?A acres

Most of the riparian areas were inventoried in 1990. There is no satisfactory rating system at this time. Riparian areas have not been systematically inventoried as to condition class and no quantitative monitoring has been done to determine changes.

Several wetlands have been enhanced through exclusion of livestock use and have shown significant improvements. Many of the other wetlands have improved through management

of livestock. For example, habitat condition in Kanab Creek Wilderness, the largest riparian area for the Kaibab N.F., is steadily improving through grazing management that only allows grazing during the winter season and soon, it may not even be grazed at all.

Based on an allotment analysis system that keys on those allotments where there are problems and the increase in areas excluded from livestock, Forest wetlands, as a whole, are improving in condition. This monitoring item would probably also cover the intent of Nos. 21, 22 and 24 effectively.

Wildlife 24 Riparian Indicator Species - (Lincoln's sparrow and yellow-breasted chat) population trends N/A numbers

There is no meaningful way that we can monitor population trends within the Kaibab National Forest. This would have to be done with Region wide sampling. Funding is doubtful, given our obligations the funding for listed species, such as the Mexican spotted owl, and declining budgets. It probably makes more sense to monitor riparian habitat conditions and make inferences concerning these indicator species. Habitat monitoring is our most effective and cost efficient method. Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 25 Aquatic Macro-Invertebrates - Species diversity and biomass N/A BCI

There is only one live stream on the Kaibab, North Canyon Creek. It has been sampled once; a base line inventory for macro-invertebrates done on North Canyon Creek in 1990. No other inventories have been done, due to funding limitations. Fish were inventoried by AZ Game & Fish Department in 1992 and found to be in good condition with a very high biomass for this size of stream. In 1996, fish were transplanted back to Ord creek by AGFD and USFWS.

Sampling has not been done on the 2 year time frame prescribed. Monitoring should continue, but, a five year time interval would be adequate based on the risk to change. This is because the entire stream is located within the Saddle Mountain Wilderness.

Wildlife 26-27 Threatened and Endangered Species - amount of suitable habitat and population trends. acres numbers

The Kaibab only has the presence of four listed species, peregrine falcon, wintering bald eagle, Apache trout, and the Mexican spotted owl. The Mexican spotted owl has already been covered earlier. The issues need to be articulated and monitored.

Habitat in North Canyon for the Apache trout is not anticipated to change but water quality measurements should be sampled (Item Wildlife 25). N/A acres N/A numbers

There really is no threat to the wintering bald eagle from Plan activities. Many other factors, such as the availability of open water, and animal carcasses present affect where the eagles are. The anount of snow on the roads affects where the counters get to for the inventories. Figures for 1993 through 1996, respectively are 21, 17, 11 and 13. N/A acres 16 numbers

The Arizona Game and Fish Department has been monitoring reproductive success for the peregrines. With their long acres numbers

term data, they are tracking favorable trends, which support possible de-listing of the peregrine. For the peregrine, the threat is disturbance to the cliff nest sites.

The largest current threats to the amount of suitable habitat for the Mexican Spotted Owl probably come from the risk of catastrophic wildfire and major outbreaks of bark beetles and budworms. With decades of fire suppression, the mixed conifer portion of the Forest has become more dense than any available evidence indicates it ever has been. Areas previously dominated by aspen and ponderosa pine have been succeeded by white fir and Douglas-fir in multiple canopy layers. While this may present a short-term benefit for the Mexican Spotted Owl, it has also created conditions which lead to forest-replacing fires, which were uncommon or even unprecedented in pre-Columbian times in the Southwest.

Bald eagles are monitored by the Forest once per year by visting popular sites and counting. Peregrine falcon populations have been monitored cooperatively by AZ Game & Fish Department and the Forest. The Peregrine population is doing very well. The Forest has two spotted owl territories that have been part of the Regional monitoring effort. Both territories still exist with no indication of a decline in the Regional or Forest population.

Wildlife 28 Sensitive Species - amount of suitable habitat and population trends. acres

This item directs population monitoring. We have an estimated 50 sensitive species. As discussed in earlier items, population monitoring is very expensive and needs to be done at a larger scale. It would be impossible to monitor the populations of 50 species. The risk of spending a lot of money and not getting reliable populations trends is very high. An example is all of the money the Region spent on the spotted owl monitoring that could not be used by the Recovery Team. The exception to this is where a species only occurs locally.

We need to monitor for the rare and special components. We have two conservation strategies which will recommend monitoring. We need to review all of the sensitive species and articulate special habitat needs and concerns and based on these build monitoring item(s). In that regard, monitoring emphasis should be placed on habitat, not population.

Wildlife 29 Diversity - successional stages of major vegetative types N/A acres

The 1997 query, using Most Similar Neighbor information is not yet complete.

We have a radically different desired condition with the 6/96 Regional Plan Amendment than previously. An evaluation needs to be made of the progress from the existing condition to the desired condition. This is being done with each Ecological Management Area (EMA). Populations can be cyclic in numbers and density-independent variables like climate, could very well be a major factor that has not been considered.

VSS is a very poor measure of successional stage in uneven-aged Forests and in most Southwestern conditions in general, where most natural and human-caused disturbance has tended to be incremental rather than stochastic. A better measure is probably the amount of biomass by size class and life form and the general trajectory these are taking on the Forest. Actual change in these factors is likely to be quite slow; none of them may be a good Plan monitoring measure. This will be considered in a future Plan amendment.

Facilities 1 Forest Transportation System

The National Forest Transportation Information System (TIS) as a measure turned out to be considerably more inaccurate than anticipated. This is because a large number of existing "two-track" roads had not been inventoried at the inception of the Forest Plan. Inventory work continues still, with 10% more miles on the inventory than in 1987. Perhaps a thousand more miles of "two-track" roads are not inventoried yet. The Forest continues to update TIS.

Since the 1993 monitoring report, an additional 65 miles of road have been obliterated. We do not have summary records of closures available.

In summary, the monitoring we are doing indicates that far from getting a handle on this problem, the situation is worse than the planners anticipated and at current budget levels, we do not have the resources available to begin to deal with it.